

I claim:

- 1 1. A lens assembly having a focal length f_0 comprising:
2 a first lens element with focal length $f_1 > 0$ having a first and second surfaces
3 the first surface being convex and facing object space,
4 a second lens element having a first and second surface, the first surface being a
5 concave surface facing the first lens element second surface, the second surface being
6 an aspheric surface, and
7 a third lens element having a first and second surface and a positive power, the
8 first surface being convex facing the second lens element second surface having a
9 radius of r_1 , the third lens element second surface having a radius of r_2 , the third lens
10 element's first and second surfaces being shaped such that $|r_2| > |r_1|$,
11 the first, second and third lens elements being shaped and coaxially positioned
12 on an optical axis to obtain a ratio of f_1/f_0 such that $0.5 < f_1/f_0 < 2.0$.

2. The lens assembly of claim 1 wherein the first lens element second surface has
a concave shape.

3. The lens assembly of claim 1 wherein the first lens element is made of glass
material.

4. The lens assembly of claim 1 wherein the third lens element second
surface is flat.

5. The lens assembly of claim 1 wherein the third lens element is made of glass
material.

6. The lens assembly of claim 1 wherein the third lens element second surface is
coated with an IR cut-off interference coating.

1 7. A lens assembly in a digital camera, the combination comprising:
 2 a camera body,
 3 an electronic imager coupled to the camera body, said electronic imager having
 4 an active surface, an image plane being formed on the active surface with a
 5 maximum effective dimension DI,
 6 the lens assembly with a focal length f_0 and having,
 7 a first lens element with focal length f_1 with $f_1 > 0$ and having a first and second
 8 surfaces, the first surface being convex,
 9 a second lens element having a first and second surface, the first surface being a
 10 concave surface facing the first lens element second surface, the second surface being
 11 an aspheric surface, and
 12 a third lens element having a first and second surface with positive power, the
 13 first surface being convex having a radius of r_1 , the second surface having a radius of
 14 r_2 ,
 15 the first, second and third lens elements being coaxially aligned and positioned
 16 on an optical axis normal to the image plane, the distance from the first lens first surface
 17 to the image plane being TT (the lens height), the lens elements being shaped and
 18 positioned such that $0.5 < f_1/f_0 < 2.0$, $|r_2| > |r_1|$, and $TT/DI < 1.5$

8. The lens assembly of claim 7 wherein the first lens element second surface has
 a concave shape.

9. The lens assembly of claim 7 wherein the first lens element is made of glass
 material.

10. The lens assembly of claim 7 claim 1 wherein the third lens element second
 surface is flat.

11. The lens assembly of claim 7 wherein the third lens element is made of glass
 material.

12. The lens assembly of claim 7 wherein the third lens element second surface is coated with an IR cut-off interference coating.

13. The lens assembly of claim 1 wherein the first, second and third lens elements are shaped to conform to the prescription of the following Table 1 and table 2 as follows:

Table 1 Surface Description of Embodiment					
Surface Number	Type	Radius	Thickness	Nd	Abbe
OBJECT,14	STANDARD	Infinity	Infinity		
50	STANDARD	1.64	1.49	1.618	63.4
58(STO)	STANDARD	3.29	0.64		
52	EVENASPH	-2.28	1.34	1.689	31.2
60	EVENASPH	-5.68	0.10		
54	STANDARD	5.88	1.22	1.801	44.3
62	STANDARD	8582.37	1.21		
IMAGE PLANE,14	STANDARD	Infinity			

Table 2 Aspheric coefficients for surfaces of element 2	
1 st Surface of Element 2 (surface 52)	
D	-0.079282116
E	-0.19307826
F	0.48564859
G	-0.71896107
H	0
I	0
2nd Surface of Element 2 (surface 60)	
D	-0.002466236
E	-0.010260173
F	0.002754689
G	-0.000681387
H	0
I	0

1 14. A lens assembly in a digital camera, the combination comprising:
2 a camera body,
3 an electronic imager coupled to the camera body, said electronic imager having
4 an active surface,
5 an image plane being formed on the active surface with maximum effective
6 dimension DI,
7 the lens assembly having ;
8 a first lens element having a positive power,
9 a second lens element and
10 a third lens element, each respective lens element having a first and second
11 surface, the first lens element first surface facing object space,
12 the second lens element first surface facing the first lens element second surface,
13 the third lens element first surface facing the second lens element second
14 surface,
15 each respective lens element being coaxially positioned on an optical axis, the
16 optical axis being perpendicular to the image plane, TT (the height of the lens
17 assembly), being the distance from the first lens element first surface to the image
18 plane, the first, second and third lens elements being shaped and sequentially
19 positioned along the optical axis to obtain a ratio of TT/DI that is less than 1.5, as an
20 image of an object is formed on the image plane.

15. The lens assembly lens assembly of claim 14 wherein:
the lens assembly has a focal length f_0 ,
the first lens element first surface is convex in shape.

16. The lens assembly of claim 15 wherein the first lens element second surface is
concave in shape and wherein the ratio of f_1 to f_0 is in a range such that $0.5 < f_1/f_0 < 2.0$

17. The lens assembly of claim 16 wherein the second lens element first surface is concave in shape.

18. The lens assembly of claim 17 wherein the second lens element second surface is aspheric in shape.

19. The lens assembly of claim 18 wherein the third lens element first surface is convex in shape, the third lens element having a positive power, the first surface having a radius of r_1 , the second surface having a radius of r_2 and wherein $|r_2| > |r_1|$.

20. The lens assembly of claim 14 wherein: the lens assembly is characterized as having a focal length f_0 and having,
a first lens element with focal length f_1 with $f_1 > 0$, the first lens element having a first and second surfaces the first surface being convex,
a second lens element, the second lens element being a meniscus lens element having a first and second surface, the first surface being concave surface facing the first lens element second surface, the second surface being an aspheric surface, and
a third lens element having a first and second surface with a positive power, the first surface having a radius of r_1 , the second surface having a radius of r_2 ,
the first, second and third lens elements being coaxially aligned and positioned on an optical axis normal to the image plane to form an image of the object on the image plane, the distance from the first lens first surface to the image plane being TT (the lens height), the lens elements being shaped and positioned such that $0.5 < f_1/f_0 < 2.0$, and $|r_2| > 10 \times |r_1|$